United States Department Of Agriculture | Forest Service | Shasta-Trinity National Forests
2400 Washington Avenue
Redding, CA 96001

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Subject: Biological Evaluation of Pests in a Timber Sale Unit along Boulder Creek Trail, Scott River RD (FPM Report N91-1)

To: Forest Supervisor, Klamath NF

On November 8, 1990, Dave Schultz, entomologist, and I met with Rick Svilich, Bernie Halterman, and Hoop George, Scott River Ranger District, to examine the cause of tree mortality in an area along Boulder Creek trail (T. 43 N., R. 11 W., section 3) where a timber sale is being considered.

The area has a stand of mature to overmature white fir, Douglas-fir, and sugar pine. It is in the regulated land base with timber production, visual quality, and recreation as the main management objectives. The proposed silvicultural prescription for the stand is to regenerate it, leaving a buffer of the existing stand along the trail. Regeneration would be accomplished by a seed tree harvest and underplanting with Douglas-fir and sugar pine. The buffer strip along the trail would have a sanitation harvest. The area would be underburned for site preparation following harvest. Some of the overstory white fir trees would be girdled after the regeneration is established because of dwarf mistletoe.

One organism present that was known to District personnel was white fir dwarf mistletoe (Arceuthobium abietinum f.sp. concoloris). This species of dwarf mistletoe only infects the white fir in this stand. Partly because of the presence of this dwarf mistletoe, no white fir was going to be planted, although it was realized that white fir would naturally seed in. Because some seed trees may be white fir, those that were infected were to be girdled when the regeneration was adequately established. Also, the sanitation harvest along the trail was directed at removing the more seriously infected white firs.

In one area of the stand, there was a several acre older harvest unit. Mortality was occurring in the larger trees around the edge of the opening and in regeneration size trees in the center. Both white fir and Douglas-fir were being affected. The windthrow, as well as the mortality, appeared to have been occurring for many years. We examined the root systems of several dead and dying trees and the exposed roots of windthrown trees and found characteristic symptoms and signs of laminated root disease caused by Phellinus weirii. This disease is common in Pacific Northwest forests and is one of the leading causes of tree mortality and lost site productivity. It has only been found in two confirmed locations previously in California. In addition to the large opening that has been created, we examined a smaller pocket of mortality and windthrow in the undisturbed stand which also had symptoms and signs of this disease. Examination of some of the roots of windthrown trees scattered in the stand

indicates that the disease is of widespread occurrence and is resulting in periodic windthrow and tree mortality throughout the stand.

Because of the relative rarity of laminated root disease on the Klamath NF, a brief discussion of its biology is appropriate. Phellinus weirii has a number of hosts that have been separated into relative susceptibility classes. The following is a presentation of those hosts appropriate to the area. Susceptible species, white fir and Douglas-fir, are the most seriously damaged by the disease. They cannot be regenerated on infested sites without serious losses prior to reaching maturity. Red fir is classified as intermediate in susceptibility. It will be infected when grown in close association with susceptible species, but will experience more butt decay than tree mortality. Planting it on an infested site will result in some losses. Tolerant species include sugar pine and western white pine. They may be infected when growing in association with the most susceptible species, but are seldom seriously damaged. Ponderosa pine and incense-cedar are resistant to the fungus and are rarely damaged. All hardwoods are immune to infection. Once established on a site, the fungus will survive for decades in the decaying root systems, jeopardizing any host tree that may contact it.

Managing stands with this disease can be difficult because of the number of hosts and the persistence of the fungus on the site. The prescription being presented by the District will result in future lost site productivity within the pockets of laminated root disease. Some of the seed trees that are left may be currently infected and opening the stand may result in windthrow for several years. This may also be true in the area along the trail where a lighter, sanitation harvest is prescribed. Douglas-fir that are planted and white fir that naturally regenerate in laminated root disease centers would likely be infected and die prior to reaching a merchantable size. Planted sugar pine may become infected but are usually not seriously damaged. However, only sugar pine stock from identified blister rust resistant trees should be used to reduce losses from white pine blister rust (caused by Cronartium ribicola). Outside of the root disease pockets, the prescription would be effective in improving long-term stand health by reducing the continued effect of white fir dwarf mistletoe on stand growth.

The first step in the treatment of this stand to increase productivity is to identify the locations of laminated root disease centers on the ground. A survey can be performed with FPM assistance to delineate these centers. Such assistance should be requested once it has been determined that stand management is appropriate. The results of this survey will provide information on the level of root disease (number and area of disease centers) and the location of centers. If the disease is at levels that will interfere with management objectives, then the following actions would be appropriate to improve stand productivity and condition. The number and location of centers would determine if these actions should be applied to the entire stand or only to individual centers.

Harvest the stand and regenerate with less susceptible species. Tolerant, resistant, and immune trees (in this case, sugar pine) could be left; however, they would be few in number and windthrow or lightning strikes might be expected. Within identified disease centers plus a 50-foot-wide surrounding

band, stumps could be pushed out and major roots removed to reduce future inoculum, but other resources and concerns, notably soil erosion and water degradation, need to be considered. If stumps are removed, the area can be regenerated with any species appropriate to the site. If stumps are not removed, the disease pockets and a 50 foot band should be planted with immune, resistant, or tolerant species. In this area, ponderosa pine, incense-cedar, and rust resistant sugar pine would be appropriate. During timber stand improvement activities susceptible species that naturally regenerate should be removed to be successful in having the fungus die out on the site. California red fir could be planted on this site with tolerable losses, but its presence may allow the fungus to persist on the site since red fir roots can become infected. The future stand should be monitored frequently to determine the success of treatment.

A public information effort through the placement of a sign along Boulder Creek trail near one of the larger disease centers could inform people of the effects of diseases on the forest ecosystem and help to explain the reasons for any management action that may be taken. FPM is available to provide input to any public information displays or efforts along this line.

FPM can provide additional assistance in developing a workable silvicultural prescription for this stand, including root disease surveys if the District desires. Please contact us if assistance is required or if you have any questions on this report. We are available for assistance at the Shasta-Trinity SO (916-246-5101, 5087, or 5300).

/s/ Gregg DeNitto

GREGG DeNITTO
Forest Pathologist
FPM Northern CA Service Area